III. Remarks

Claims 1-76 were previously pending.

Claims 1-76 were rejected in the Office Action mailed April 21, 2006.

Claims 1-76 have been canceled without prejudice or disclaimer.

Claims 77-87 have been added.

As a result, claims 77-87 are pending.

Reconsideration of this application in light of the above amendments and the following remarks is respectfully requested.

Rejections Under 35 U.S.C. §102

Claims 1-3, 13-19, 24-26, 36-40, 45-47, 56-61, 66 and 71-76

Claims 1-3, 13-19, 24-26, 36-40, 45-47, 56-61, 66 and 71-76 each stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,534,427 to Wang et al. ("Wang"). These rejections are no longer applicable since claims 1-3, 13-19, 24-26, 36-40, 45-47, 56-61, 66 and 71-76 have been canceled without prejudice or disclaimer.

Claims 15, 16 and 20

Claims 15, 16 and 20 each stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Pat. No. 6,386,300 to Curlett et al. ("Curlett '300"). These rejections are no longer applicable since claims 15, 16 and 20 have been canceled without prejudice or disclaimer.

Rejections Under 35 U.S.C. §103

Claims 1-14, 17-19 and 21-76 each stand rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of U.S. Pat. No. 5,862,871 to Curlett ("Curlett '871"). These rejections are no longer applicable since claims 1-14, 17-19 and 21-76 have been canceled without prejudice or disclaimer.

NEW CLAIMS

Independent Claim 77

New independent claim 77 distinguishes over the patents applied in the Office Action mailed April 21, 2006 and is allowable for the following reasons.

Claim 77 recites: A method of drilling a bore in a formation, the method comprising:

supplying solid material impactors to a drill bit comprising a longitudinal axis; and

discharging the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, comprising:

discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising:

a first directional component that is parallel to the longitudinal axis of the drill bit; and

a second directional component extending from, and perpendicular to, the first directional component;

and

discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising:

a third directional component that is parallel to the longitudinal axis of the drill bit; and

a fourth directional component extending from, and perpendicular to, the third directional component.

Although some of the previous claims were rejected under 35 U.S.C. §102 as being anticipated by either Wang or Curlett '300, neither of these rejections is applicable to new claim 77 for the following reasons.

The PTO provides in MPEP §2131 that:

"[t]o anticipate a claim, the reference must teach every element of the claim."

Therefore, to support a rejection under 35 U.S.C. §102 with respect to claim 77, a reference must contain every element of claim 77 for the reference to anticipate the claim. However, neither Wang nor Curlett '300 teaches, motivates or suggests a method of drilling a bore in a formation, the method comprising supplying solid material impactors to a drill bit comprising a longitudinal axis; and discharging the solid material impactors from the drill bit so

that at least a portion of the solid material impactors contacts the formation, comprising discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component.

As a result, the previous rejections based on 35 U.S.C. §102 cannot be supported by either Wang or Curlett '300 as applied to new claim 77.

Although some of the previous claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of Curlett '871, this rejection is not applicable to new clam 77.

As the PTO recognizes in MPEP §2142:

> *The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a* prima facie *case, the applicant is under no obligation to submit evidence of nonobviousness.*

The Examiner clearly cannot establish a *prima facie* case of obviousness in connection with new claim 77 for the following reasons.

35 U.S.C. §103(a) provides that:

> *[a] patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains ... (emphasis added)*

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Curlett '300 and Curlett '871, alone, or in combination, do not teach, suggest or motivate a method of drilling a bore in a formation, the method comprising supplying solid material impactors to a drill bit comprising a longitudinal axis; and discharging the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, comprising discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component; and

discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component.

Therefore, it is impossible to render the subject matter of claim 77 as a whole obvious based on any combination of the patents, and the above explicit terms of the statute cannot be met. As a result, the Examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 77, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why Curlett '300 and Curlett '871 cannot be applied to reject claim 77 under 35 U.S.C. §103(a).

The PTO also provides in MPEP §2142:

> *[T]he examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. ...[I]mpermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.*

Here, Curlett '300 and Curlett '871 do not teach, suggest or motivate the desirability of the subject matter of claim 77 since neither patent teaches, suggests or motivates providing a method of drilling a bore in a formation, the method comprising supplying solid material impactors to a drill bit comprising a longitudinal axis; and discharging the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, comprising discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component.

Thus, neither of these patents provides any incentive or motivation supporting the desirability of the subject matter of claim 77. Therefore, there is simply no basis in the art to support a rejection of claim 77 under 35 U.S.C. §103(a).

Independent Claim 78

New independent claim 78 distinguishes over the patents applied in the Office Action mailed April 21, 2006 and is allowable for the following reasons.

Claim 78 recites: A method of drilling a bore in a formation, the method comprising:

supplying solid material impactors to a drill bit comprising a longitudinal axis;

discharging the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, comprising:

discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising:

a first directional component that is parallel to the longitudinal axis of the drill bit; and

a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal axis of the drill bit;

and

discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising:

a third directional component that is parallel to the longitudinal axis of the drill bit; and

a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit;

forming a rock ring within the bore in response to discharging the solid material impactors from the drill bit, comprising:

forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and

forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring;

and

fracturing the rock ring, comprising:

applying a side load on the rock ring;

wherein the drill bit comprises a junk slot; and

wherein forming the interior cavity comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the junk slot.

Although some of the previous claims were rejected under 35 U.S.C. §102 as being anticipated by either Wang or Curlett '300, neither of these rejections is applicable to new claim 78 for the following reasons.

As discussed above, a reference must teach every element of a claim for the reference to anticipate the claim. However, neither Wang nor Curlett '300 teaches, motivates or suggests a method of drilling a bore in a formation, the method comprising supplying solid material impactors to a drill bit comprising a longitudinal axis; discharging the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, comprising discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal axis of the drill bit; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit; forming a rock ring within the bore in response to discharging the solid material impactors from the drill bit, comprising forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring; and fracturing the rock ring, comprising applying a side load on the rock ring; wherein the drill bit comprises a junk slot; and wherein forming the interior cavity comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the junk slot.

As a result, the previous rejections based on 35 U.S.C. §102 cannot be supported by either Wang or Curlett '300 as applied to new claim 78.

Although some of the previous claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of Curlett '871, this rejection is not applicable to new clam 78.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Curlett '300 and Curlett '871, alone, or in combination, do not teach, suggest or motivate a method of drilling a bore in a formation, the method comprising supplying solid material impactors to a drill bit comprising a longitudinal axis; discharging the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, comprising discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal axis of the drill bit; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit; forming a rock ring within the bore in response to discharging the solid material impactors from the drill bit, comprising forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring; and fracturing the rock ring, comprising applying a side load on the rock ring; wherein the drill bit comprises a junk slot; and wherein forming the interior cavity comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the junk slot.

Therefore, it is impossible to render the subject matter of claim 78 as a whole obvious based on any combination of the patents, and the above explicit terms of the statute cannot be met. As a result, the Examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 78, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why Curlett '300 and Curlett '871 cannot be applied to reject claim 78 under 35 U.S.C. §103(a). Here, Curlett '300 and Curlett '871 do not teach, suggest or motivate the desirability of the subject matter of claim 78 since neither patent teaches, suggests or motivates providing a method of drilling a bore in a formation, the method comprising supplying solid material impactors to a drill bit comprising a

longitudinal axis; discharging the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, comprising discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal axis of the drill bit; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit; forming a rock ring within the bore in response to discharging the solid material impactors from the drill bit, comprising forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring; and fracturing the rock ring, comprising applying a side load on the rock ring; wherein the drill bit comprises a junk slot; and wherein forming the interior cavity comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the junk slot.

Thus, neither of these patents provides any incentive or motivation supporting the desirability of the subject matter of claim 78. Therefore, there is simply no basis in the art to support a rejection of claim 78 under 35 U.S.C. §103(a).

Independent Claim 79

New independent claim 79 distinguishes over the patents applied in the Office Action mailed April 21, 2006 and is allowable for the following reasons.

Claim 79 recites: A method of drilling a bore in a formation, the method comprising:

supplying drilling fluid and solid material impactors to a drill bit;

discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation; and

forming a rock ring within the bore in response to discharging the drilling fluid and the solid material impactors from the drill bit.

Although some of the previous claims were rejected under 35 U.S.C. §102 as being

anticipated by either Wang or Curlett '300, neither of these rejections is applicable to new claim 79 for the following reasons.

As discussed above, a reference must teach every element of a claim for the reference to anticipate the claim. However, neither Wang nor Curlett '300 teaches, motivates or suggests a method of drilling a bore in a formation, the method comprising supplying drilling fluid and solid material impactors to a drill bit; discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation; and forming a rock ring within the bore in response to discharging the drilling fluid and the solid material impactors from the drill bit.

As a result, the previous rejections based on 35 U.S.C. §102 cannot be supported by either Wang or Curlett '300 as applied to new claim 79.

Although some of the previous claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of Curlett '871, this rejection is not applicable to new clam 79.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Curlett '300 and Curlett '871, alone, or in combination, do not teach, suggest or motivate a method of drilling a bore in a formation, the method comprising supplying drilling fluid and solid material impactors to a drill bit; discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation; and forming a rock ring within the bore in response to discharging the drilling fluid and the solid material impactors from the drill bit.

Therefore, it is impossible to render the subject matter of claim 79 as a whole obvious based on any combination of the patents, and the above explicit terms of the statute cannot be met. As a result, the Examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 79, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why Curlett '300 and Curlett '871 cannot be applied to reject claim 79 under 35 U.S.C. §103(a). Here, Curlett '300 and Curlett '871 do not teach, suggest or motivate the desirability of the subject matter of claim 79 since neither patent teaches, suggests or motivates providing a method of drilling a bore in a formation, the method comprising supplying drilling fluid and solid material impactors to a drill bit; discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation; and forming a rock ring within

the bore in response to discharging the drilling fluid and the solid material impactors from the drill bit.

Thus, neither of these patents provides any incentive or motivation supporting the desirability of the subject matter of claim 79. Therefore, there is simply no basis in the art to support a rejection of claim 79 under 35 U.S.C. §103(a).

Independent Claim 80

New independent claim 80 distinguishes over the patents applied in the Office Action mailed April 21, 2006 and is allowable for the following reasons.

Claim 80 recites: A drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; and a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component.

Although some of the previous claims were rejected under 35 U.S.C. §102 as being anticipated by either Wang or Curlett '300, neither of these rejections is applicable to new claim 80 for the following reasons.

As discussed above, a reference must teach every element of a claim for the reference to anticipate the claim. However, neither Wang nor Curlett '300 teaches, motivates or suggests a drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; and a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component.

As a result, the previous rejections based on 35 U.S.C. §102 cannot be supported by either Wang or Curlett '300 as applied to new claim 80.

Although some of the previous claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of Curlett '871, this rejection is not applicable to new clam 80.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Curlett '300 and Curlett '871, alone, or in combination, do not teach, suggest or motivate a drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; and a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component.

Therefore, it is impossible to render the subject matter of claim 80 as a whole obvious based on any combination of the patents, and the above explicit terms of the statute cannot be met. As a result, the Examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 80, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why Curlett '300 and Curlett '871 cannot be applied to reject claim 80 under 35 U.S.C. §103(a). Here, Curlett '300 and Curlett '871 do not teach, suggest or motivate the desirability of the subject matter of claim 80 since neither patent teaches, suggests or motivates providing a drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; and a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component.

Thus, neither of these patents provides any incentive or motivation supporting the desirability of the subject matter of claim 80. Therefore, there is simply no basis in the art to support a rejection of claim 80 under 35 U.S.C. §103(a).

Independent Claim 81

New independent claim 81 distinguishes over the patents applied in the Office Action mailed April 21, 2006 and is allowable for the following reasons.

Claim 81 recites: A drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component; first and second side arms, one of the first and second side arms comprising one of the first and second nozzles; and a center portion disposed between the first and second side arms; wherein each of the first and second nozzles is adapted to discharge drilling fluid and solid material impactors in a bore in a formation; wherein a rock ring is adapted to be at least partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors; wherein the center portion comprises a breaker surface adapted to break the rock ring; wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring; wherein the center portion comprises the other of the first and second nozzles; wherein the conical surface tapers to the other of the first and second nozzles; and wherein each of the first and second side arms comprises a bottom face, a side wall extending from the bottom face, one or more mechanical cutters interspersed along the bottom face, and one or more grooves formed in the bottom face.

Although some of the previous claims were rejected under 35 U.S.C. §102 as being anticipated by either Wang or Curlett '300, neither of these rejections is applicable to new claim 81 for the following reasons.

As discussed above, a reference must teach every element of a claim for the reference to anticipate the claim. However, neither Wang nor Curlett '300 teaches, motivates or suggests a drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component; first and second side arms, one of the first and second side arms comprising one of the first and second nozzles; and a center portion disposed between the first and second side arms; wherein each of the first and second nozzles is adapted to discharge drilling fluid and solid material impactors in a bore in a formation; wherein a rock ring is adapted to be at least

partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors; wherein the center portion comprises a breaker surface adapted to break the rock ring; wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring; wherein the center portion comprises the other of the first and second nozzles; wherein the conical surface tapers to the other of the first and second nozzles; and wherein each of the first and second side arms comprises a bottom face, a side wall extending from the bottom face, one or more mechanical cutters interspersed along the bottom face, and one or more grooves formed in the bottom face.

As a result, the previous rejections based on 35 U.S.C. §102 cannot be supported by either Wang or Curlett '300 as applied to new claim 81.

Although some of the previous claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of Curlett '871, this rejection is not applicable to new clam 81.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Curlett '300 and Curlett '871, alone, or in combination, do not teach, suggest or motivate a drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component; first and second side arms, one of the first and second side arms comprising one of the first and second nozzles; and a center portion disposed between the first and second side arms; wherein each of the first and second nozzles is adapted to discharge drilling fluid and solid material impactors in a bore in a formation; wherein a rock ring is adapted to be at least partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors; wherein the center portion comprises a breaker surface adapted to break the rock ring; wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring; wherein the center portion comprises the other of the first and second nozzles; wherein the conical surface tapers to the other of the first and second nozzles; and wherein each of the first and second side arms comprises a bottom face, a side wall extending from the bottom face, one or more mechanical cutters interspersed along the bottom face, and one or more grooves formed

in the bottom face.

Therefore, it is impossible to render the subject matter of claim 81 as a whole obvious based on any combination of the patents, and the above explicit terms of the statute cannot be met. As a result, the Examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 81, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why Curlett '300 and Curlett '871 cannot be applied to reject claim 81 under 35 U.S.C. §103(a). Here, Curlett '300 and Curlett '871 do not teach, suggest or motivate the desirability of the subject matter of claim 81 since neither patent teaches, suggests or motivates providing a drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component; a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component; first and second side arms, one of the first and second side arms comprising one of the first and second nozzles; and a center portion disposed between the first and second side arms; wherein each of the first and second nozzles is adapted to discharge drilling fluid and solid material impactors in a bore in a formation; wherein a rock ring is adapted to be at least partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors; wherein the center portion comprises a breaker surface adapted to break the rock ring; wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring; wherein the center portion comprises the other of the first and second nozzles; wherein the conical surface tapers to the other of the first and second nozzles; and wherein each of the first and second side arms comprises a bottom face, a side wall extending from the bottom face, one or more mechanical cutters interspersed along the bottom face, and one or more grooves formed in the bottom face.

Thus, neither of these patents provides any incentive or motivation supporting the desirability of the subject matter of claim 81. Therefore, there is simply no basis in the art to support a rejection of claim 81 under 35 U.S.C. §103(a).

Independent Claims 82-84

New independent claims 82-84 invoke 35 U.S.C. §112, sixth paragraph, reciting one or more functions and/or limitations that correspond to the subject matter in new method claims 77-79, respectively. Therefore, claims 82-84 are allowable for at least the same reasons as noted above with respect to claims 77-79, respectively.

Independent Claim 85

New independent claim 85 distinguishes over the patents applied in the Office Action mailed April 21, 2006 and is allowable for the following reasons.

Claim 85 recites: A method of drilling a bore in a formation, the method comprising:

supplying drilling fluid and solid material impactors to a drill bit comprising a longitudinal axis, comprising coupling a drill string to the drill bit, the drill string comprising a passage through which the drilling fluid is supplied to the drill bit, wherein an annulus is defined between the drill string and the inner wall of the bore;

discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, wherein formation cuttings are formed in response to discharging the drilling fluid and the solid material impactors from the drill bit, wherein discharging the drilling fluid and the solid material impactors from the drill bit comprises:

discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising:

a first directional component that is parallel to the longitudinal axis of the drill bit; and

a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal axis of the drill bit;

and

discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising:

a third directional component that is parallel to the longitudinal axis of the drill bit; and

a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit;

forming a rock ring within the bore, comprising:

at least one of:

discharging the first portion of the solid material impactors from the drill bit in the first direction; and

discharging the second portion of the solid material impactors from the drill bit in the second direction;

forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and

forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring;

fracturing the rock ring, comprising:

applying a side load on the rock ring;

breaking down large portions of the rock ring; and

abrading and delivering load to the rock ring;

circulating at least a portion of the solid material impactors through the annulus;

abrading the bottom surface of the bore;

forming the final diameter of the bore, comprising at least one of:

trimming the bore; and

refining the inner wall of the bore;

stabilizing and reducing vibration in the drill bit; and

permitting the drilling fluid, at least a portion of the cuttings, and at least a portion of the solid material impactors to flow freely from the bottom surface of the bore and to the annulus;

wherein the drill bit comprises first and second junk slots;

wherein forming the interior cavity comprises:

causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the first junk slot; and

causing at least another portion of the solid material impactors to contact the bottom surface of the bore and rebound into the first junk slot;

wherein forming the exterior cavity further comprises:

causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the second junk slot;

wherein the exterior cavity comprises generally circumferentially-extending inner and outer portions, the inner and outer portions being generally concentric;

wherein forming the exterior cavity comprises:

cutting the formation at the outer portion of the exterior cavity; and

cutting the formation at the inner portion of the exterior cavity;

wherein residual pieces of the rock ring are formed in response to fracturing the rock ring;

wherein the method further comprises washing at least a portion of the residual pieces of the rock ring away from the drill bit through the annulus;

wherein broken portions of the rock ring are formed in response to fracturing the rock ring;

wherein the method further comprises:

permitting the broken portions of the rock ring to flow from the bottom surface of the bore to the first and second junk slots; and

guiding the cuttings and the drilling fluid to the annulus via the first and second junk slots;

wherein the drill bit comprises first, second and third nozzles; and

wherein discharging the drilling fluid and the solid material impactors from the drill bit comprises:

feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the first nozzle;

feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the second nozzle; and

feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the third nozzle.

Although some of the previous claims were rejected under 35 U.S.C. §102 as being anticipated by either Wang or Curlett '300, neither of these rejections is applicable to new claim 85 for the following reasons.

As discussed above, a reference must teach every element of a claim for the reference to anticipate the claim. However, neither Wang nor Curlett '300 teaches, motivates or suggests a method of drilling a bore in a formation, the method comprising supplying drilling fluid and

solid material impactors to a drill bit comprising a longitudinal axis, comprising coupling a drill string to the drill bit, the drill string comprising a passage through which the drilling fluid is supplied to the drill bit, wherein an annulus is defined between the drill string and the inner wall of the bore; discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, wherein formation cuttings are formed in response to discharging the drilling fluid and the solid material impactors from the drill bit, wherein discharging the drilling fluid and the solid material impactors from the drill bit comprises discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal axis of the drill bit; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit; forming a rock ring within the bore, comprising at least one of discharging the first portion of the solid material impactors from the drill bit in the first direction; and discharging the second portion of the solid material impactors from the drill bit in the second direction; forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring; fracturing the rock ring, comprising applying a side load on the rock ring; breaking down large portions of the rock ring; and abrading and delivering load to the rock ring; circulating at least a portion of the solid material impactors through the annulus; abrading the bottom surface of the bore; forming the final diameter of the bore, comprising at least one of trimming the bore; and refining the inner wall of the bore; stabilizing and reducing vibration in the drill bit; and permitting the drilling fluid, at least a portion of the cuttings, and at least a portion of the solid material impactors to flow freely from the bottom surface of the bore and to the annulus; wherein the drill bit comprises first and second junk slots; wherein forming the interior cavity comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the first junk slot; and causing at least another portion of the solid material impactors to contact the bottom

surface of the bore and rebound into the first junk slot; wherein forming the exterior cavity further comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the second junk slot; wherein the exterior cavity comprises generally circumferentially-extending inner and outer portions, the inner and outer portions being generally concentric; wherein forming the exterior cavity comprises cutting the formation at the outer portion of the exterior cavity; and cutting the formation at the inner portion of the exterior cavity; wherein residual pieces of the rock ring are formed in response to fracturing the rock ring; wherein the method further comprises washing at least a portion of the residual pieces of the rock ring away from the drill bit through the annulus; wherein broken portions of the rock ring are formed in response to fracturing the rock ring; wherein the method further comprises permitting the broken portions of the rock ring to flow from the bottom surface of the bore to the first and second junk slots; and guiding the cuttings and the drilling fluid to the annulus via the first and second junk slots; wherein the drill bit comprises first, second and third nozzles; and wherein discharging the drilling fluid and the solid material impactors from the drill bit comprises feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the first nozzle; feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the second nozzle; and feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the third nozzle.

As a result, the previous rejections based on 35 U.S.C. §102 cannot be supported by either Wang or Curlett '300 as applied to new claim 85.

Although some of the previous claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of Curlett '871, this rejection is not applicable to new clam 85.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Curlett '300 and Curlett '871, alone, or in combination, do not teach, suggest or motivate a method of drilling a bore in a formation, the method comprising supplying drilling fluid and solid material impactors to a drill bit comprising a longitudinal axis, comprising coupling a drill string to the drill bit, the drill string comprising a passage through which the drilling fluid is supplied to the drill bit, wherein an annulus is defined between the drill string and the inner wall of the bore; discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, wherein formation cuttings are formed in response to discharging the drilling fluid and the solid material impactors from the drill bit, wherein discharging the drilling

fluid and the solid material impactors from the drill bit comprises discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal axis of the drill bit; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit; forming a rock ring within the bore, comprising at least one of discharging the first portion of the solid material impactors from the drill bit in the first direction; and discharging the second portion of the solid material impactors from the drill bit in the second direction; forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring; fracturing the rock ring, comprising applying a side load on the rock ring; breaking down large portions of the rock ring; and abrading and delivering load to the rock ring; circulating at least a portion of the solid material impactors through the annulus; abrading the bottom surface of the bore; forming the final diameter of the bore, comprising at least one of trimming the bore; and refining the inner wall of the bore; stabilizing and reducing vibration in the drill bit; and permitting the drilling fluid, at least a portion of the cuttings, and at least a portion of the solid material impactors to flow freely from the bottom surface of the bore and to the annulus; wherein the drill bit comprises first and second junk slots; wherein forming the interior cavity comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the first junk slot; and causing at least another portion of the solid material impactors to contact the bottom surface of the bore and rebound into the first junk slot; wherein forming the exterior cavity further comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the second junk slot; wherein the exterior cavity comprises generally circumferentially-extending inner and outer portions, the inner and outer portions being generally concentric; wherein forming the exterior cavity comprises cutting the formation at the outer portion of the exterior cavity; and cutting the formation at the inner portion of the exterior cavity; wherein

residual pieces of the rock ring are formed in response to fracturing the rock ring; wherein the method further comprises washing at least a portion of the residual pieces of the rock ring away from the drill bit through the annulus; wherein broken portions of the rock ring are formed in response to fracturing the rock ring; wherein the method further comprises permitting the broken portions of the rock ring to flow from the bottom surface of the bore to the first and second junk slots; and guiding the cuttings and the drilling fluid to the annulus via the first and second junk slots; wherein the drill bit comprises first, second and third nozzles; and wherein discharging the drilling fluid and the solid material impactors from the drill bit comprises feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the first nozzle; feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the second nozzle; and feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the third nozzle.

Therefore, it is impossible to render the subject matter of claim 85 as a whole obvious based on any combination of the patents, and the above explicit terms of the statute cannot be met. As a result, the Examiner's burden of factually supporting a *prima facie* case of obviousness clearly cannot be met with respect to claim 85, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why Curlett '300 and Curlett '871 cannot be applied to reject claim 85 under 35 U.S.C. §103(a). Here, Curlett '300 and Curlett '871 do not teach, suggest or motivate the desirability of the subject matter of claim 85 since neither patent teaches, suggests or motivates providing a method of drilling a bore in a formation, the method comprising supplying drilling fluid and solid material impactors to a drill bit comprising a longitudinal axis, comprising coupling a drill string to the drill bit, the drill string comprising a passage through which the drilling fluid is supplied to the drill bit, wherein an annulus is defined between the drill string and the inner wall of the bore; discharging the drilling fluid and the solid material impactors from the drill bit so that at least a portion of the solid material impactors contacts the formation, wherein formation cuttings are formed in response to discharging the drilling fluid and the solid material impactors from the drill bit, wherein discharging the drilling fluid and the solid material impactors from the drill bit comprises discharging a first portion of the solid material impactors from the drill bit in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal axis of the drill bit; and a second directional component extending from, and perpendicular to, the first directional component, wherein the second directional component is directed away from the

longitudinal axis of the drill bit; and discharging a second portion of the solid material impactors from the drill bit in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal axis of the drill bit; and a fourth directional component extending from, and perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal axis of the drill bit; forming a rock ring within the bore, comprising at least one of discharging the first portion of the solid material impactors from the drill bit in the first direction; and discharging the second portion of the solid material impactors from the drill bit in the second direction; forming a generally radially-extending interior cavity in the bore, the interior cavity generally defining the inside diameter of the rock ring; and forming a generally circumferentially-extending exterior cavity in the bore, the exterior cavity being generally concentric with the interior cavity, the exterior cavity generally defining the outside diameter of the rock ring; fracturing the rock ring, comprising applying a side load on the rock ring; breaking down large portions of the rock ring; and abrading and delivering load to the rock ring; circulating at least a portion of the solid material impactors through the annulus; abrading the bottom surface of the bore; forming the final diameter of the bore, comprising at least one of trimming the bore; and refining the inner wall of the bore; stabilizing and reducing vibration in the drill bit; and permitting the drilling fluid, at least a portion of the cuttings, and at least a portion of the solid material impactors to flow freely from the bottom surface of the bore and to the annulus; wherein the drill bit comprises first and second junk slots; wherein forming the interior cavity comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the first junk slot; and causing at least another portion of the solid material impactors to contact the bottom surface of the bore and rebound into the first junk slot; wherein forming the exterior cavity further comprises causing at least a portion of the solid material impactors to contact the bottom surface of the bore and rebound into the second junk slot; wherein the exterior cavity comprises generally circumferentially-extending inner and outer portions, the inner and outer portions being generally concentric; wherein forming the exterior cavity comprises cutting the formation at the outer portion of the exterior cavity; and cutting the formation at the inner portion of the exterior cavity; wherein residual pieces of the rock ring are formed in response to fracturing the rock ring; wherein the method further comprises washing at least a portion of the residual pieces of the rock ring away from the drill bit through the annulus; wherein broken portions of the rock ring are formed in response to fracturing the rock ring; wherein the method further comprises permitting the broken portions of the rock ring to flow from the bottom surface of the bore to the

first and second junk slots; and guiding the cuttings and the drilling fluid to the annulus via the first and second junk slots; wherein the drill bit comprises first, second and third nozzles; and wherein discharging the drilling fluid and the solid material impactors from the drill bit comprises feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the first nozzle; feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the second nozzle; and feeding at least a portion of the drilling fluid and at least a portion of the solid material impactors to the third nozzle.

Thus, neither of these patents provides any incentive or motivation supporting the desirability of the subject matter of claim 85. Therefore, there is simply no basis in the art to support a rejection of claim 85 under 35 U.S.C. §103(a).

Independent Claim 86

New independent claim 86 distinguishes over the patents applied in the Office Action mailed April 21, 2006 and is allowable for the following reasons.

Claim 86 recites: A drill bit adapted to discharge drilling fluid and solid material impactors in a bore in a formation, the drill bit comprising:

a longitudinal center axis;

a first nozzle oriented in a first direction, the first direction comprising:

a first directional component that is parallel to the longitudinal center axis, and

a second directional component extending from, and generally perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal center axis;

a second nozzle oriented in a second direction, the second direction comprising:

a third directional component that is parallel to the longitudinal center axis, and

a fourth directional component extending from, and generally perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal center axis;

a third nozzle adapted to discharge a third portion of the solid material impactors in the bore;

first, second and third cavities fluidicly coupled to the first, second and third nozzles, respectively, wherein the cavities are adapted to be fluidicly coupled to a common plenum;

first and second side arms, each of the first and second side arms comprising a radially

interior portion and a radially exterior portion, the first side arm comprising the third nozzle and one of the first and second nozzles;

a center portion disposed between the first and second side arms, the center portion comprising the other of the first and second nozzles;

a first junk slot extending between the first and second arms; and

a second junk slot extending between the first and second arms;

wherein the center portion is disposed between the first and second junk slots;

wherein a rock ring is adapted to be at least partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors;

wherein the center portion comprises a breaker surface adapted to break the rock ring;

wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring;

wherein the conical surface tapers to the other of the first and second nozzles;

wherein the breaker surface comprises one or more mechanical cutters adapted to abrade and load the rock ring;

wherein the second direction is configured so that at least a portion of the solid material impactors adapted to be discharged from the second nozzle are adapted to contact the formation and rebound into the first junk slot;

wherein the first direction is configured so that at least a portion of the solid material impactors adapted to be discharged from the first nozzle are adapted to contact the formation and rebound into the second junk slot;

wherein the breaker surface comprises one or more recesses adapted to permit broken portions of the rock ring to flow from the bottom surface of the bore to the first junk slot; and

wherein each of the first and second side arms comprises:

a bottom face;

a side wall extending from the bottom face;

one or more mechanical cutters interspersed along the bottom face and adapted to break down large portions of the rock ring and abrade the bottom surface of the bore;

one or more grooves formed in the bottom face;

one or more other mechanical cutters interspersed along the side wall, wherein the one or more other mechanical cutters comprise one or more gauge cutters adapted to form the final diameter of the bore, and wherein at least one of the gauge cutters comprises a cutting face adapted to contact the inner wall of the bore; and

one or more gauge bearing surfaces interspersed along the side wall and adapted to reduce vibration generated during the discharge of the drilling fluid and the solid material impactors.

Although some of the previous claims were rejected under 35 U.S.C. §102 as being anticipated by either Wang or Curlett '300, neither of these rejections is applicable to new claim 86 for the following reasons.

As discussed above, a reference must teach every element of a claim for the reference to anticipate the claim. However, neither Wang nor Curlett '300 teaches, motivates or suggests a drill bit adapted to discharge drilling fluid and solid material impactors in a bore in a formation, the drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal center axis; a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal center axis; a third nozzle adapted to discharge a third portion of the solid material impactors in the bore; first, second and third cavities fluidicly coupled to the first, second and third nozzles, respectively, wherein the cavities are adapted to be fluidicly coupled to a common plenum; first and second side arms, each of the first and second side arms comprising a radially interior portion and a radially exterior portion, the first side arm comprising the third nozzle and one of the first and second nozzles; a center portion disposed between the first and second side arms, the center portion comprising the other of the first and second nozzles; a first junk slot extending between the first and second arms; and a second junk slot extending between the first and second arms; wherein the center portion is disposed between the first and second junk slots; wherein a rock ring is adapted to be at least partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors; wherein the center portion comprises a breaker surface adapted to break the rock ring; wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring; wherein the conical surface tapers to the other of the first and second nozzles; wherein the breaker surface comprises one or more mechanical cutters adapted to abrade and load the rock ring; wherein the second direction is configured so that at least a portion of the solid material impactors

adapted to be discharged from the second nozzle are adapted to contact the formation and rebound into the first junk slot; wherein the first direction is configured so that at least a portion of the solid material impactors adapted to be discharged from the first nozzle are adapted to contact the formation and rebound into the second junk slot; wherein the breaker surface comprises one or more recesses adapted to permit broken portions of the rock ring to flow from the bottom surface of the bore to the first junk slot; and wherein each of the first and second side arms comprises a bottom face; a side wall extending from the bottom face; one or more mechanical cutters interspersed along the bottom face and adapted to break down large portions of the rock ring and abrade the bottom surface of the bore; one or more grooves formed in the bottom face; one or more other mechanical cutters interspersed along the side wall, wherein the one or more other mechanical cutters comprise one or more gauge cutters adapted to form the final diameter of the bore, and wherein at least one of the gauge cutters comprises a cutting face adapted to contact the inner wall of the bore; and one or more gauge bearing surfaces interspersed along the side wall and adapted to reduce vibration generated during the discharge of the drilling fluid and the solid material impactors.

As a result, the previous rejections based on 35 U.S.C. §102 cannot be supported by either Wang or Curlett '300 as applied to new claim 86.

Although some of the previous claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Curlett '300 in view of Curlett '871, this rejection is not applicable to new clam 86.

As discussed above, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, Curlett '300 and Curlett '871, alone, or in combination, do not teach, suggest or motivate a drill bit adapted to discharge drilling fluid and solid material impactors in a bore in a formation, the drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal center axis; a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal center axis; a third nozzle adapted to discharge a third portion of the solid material impactors in the bore; first, second and

third cavities fluidicly coupled to the first, second and third nozzles, respectively, wherein the cavities are adapted to be fluidicly coupled to a common plenum; first and second side arms, each of the first and second side arms comprising a radially interior portion and a radially exterior portion, the first side arm comprising the third nozzle and one of the first and second nozzles; a center portion disposed between the first and second side arms, the center portion comprising the other of the first and second nozzles; a first junk slot extending between the first and second arms; and a second junk slot extending between the first and second arms; wherein the center portion is disposed between the first and second junk slots; wherein a rock ring is adapted to be at least partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors; wherein the center portion comprises a breaker surface adapted to break the rock ring; wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring; wherein the conical surface tapers to the other of the first and second nozzles; wherein the breaker surface comprises one or more mechanical cutters adapted to abrade and load the rock ring; wherein the second direction is configured so that at least a portion of the solid material impactors adapted to be discharged from the second nozzle are adapted to contact the formation and rebound into the first junk slot; wherein the first direction is configured so that at least a portion of the solid material impactors adapted to be discharged from the first nozzle are adapted to contact the formation and rebound into the second junk slot; wherein the breaker surface comprises one or more recesses adapted to permit broken portions of the rock ring to flow from the bottom surface of the bore to the first junk slot; and wherein each of the first and second side arms comprises a bottom face; a side wall extending from the bottom face; one or more mechanical cutters interspersed along the bottom face and adapted to break down large portions of the rock ring and abrade the bottom surface of the bore; one or more grooves formed in the bottom face; one or more other mechanical cutters interspersed along the side wall, wherein the one or more other mechanical cutters comprise one or more gauge cutters adapted to form the final diameter of the bore, and wherein at least one of the gauge cutters comprises a cutting face adapted to contact the inner wall of the bore; and one or more gauge bearing surfaces interspersed along the side wall and adapted to reduce vibration generated during the discharge of the drilling fluid and the solid material impactors.

Therefore, it is impossible to render the subject matter of claim 86 as a whole obvious based on any combination of the patents, and the above explicit terms of the statute cannot be met. As a result, the Examiner's burden of factually supporting a *prima facie* case of

obviousness clearly cannot be met with respect to claim 86, and a rejection under 35 U.S.C. §103(a) is not applicable.

There is still another compelling, and mutually exclusive, reason why Curlett '300 and Curlett '871 cannot be applied to reject claim 86 under 35 U.S.C. §103(a). Here, Curlett '300 and Curlett '871 do not teach, suggest or motivate the desirability of the subject matter of claim 86 since neither patent teaches, suggests or motivates providing a drill bit adapted to discharge drilling fluid and solid material impactors in a bore in a formation, the drill bit comprising a longitudinal center axis; a first nozzle oriented in a first direction, the first direction comprising a first directional component that is parallel to the longitudinal center axis, and a second directional component extending from, and generally perpendicular to, the first directional component, wherein the second directional component is directed away from the longitudinal center axis; a second nozzle oriented in a second direction, the second direction comprising a third directional component that is parallel to the longitudinal center axis, and a fourth directional component extending from, and generally perpendicular to, the third directional component, wherein the fourth directional component is directed towards the longitudinal center axis; a third nozzle adapted to discharge a third portion of the solid material impactors in the bore; first, second and third cavities fluidicly coupled to the first, second and third nozzles, respectively, wherein the cavities are adapted to be fluidicly coupled to a common plenum; first and second side arms, each of the first and second side arms comprising a radially interior portion and a radially exterior portion, the first side arm comprising the third nozzle and one of the first and second nozzles; a center portion disposed between the first and second side arms, the center portion comprising the other of the first and second nozzles; a first junk slot extending between the first and second arms; and a second junk slot extending between the first and second arms; wherein the center portion is disposed between the first and second junk slots; wherein a rock ring is adapted to be at least partially formed within the bore in response to the discharge of the drilling fluid and the solid material impactors; wherein the center portion comprises a breaker surface adapted to break the rock ring; wherein the breaker surface comprises a conical surface adapted to apply a side load against the rock ring; wherein the conical surface tapers to the other of the first and second nozzles; wherein the breaker surface comprises one or more mechanical cutters adapted to abrade and load the rock ring; wherein the second direction is configured so that at least a portion of the solid material impactors adapted to be discharged from the second nozzle are adapted to contact the formation and rebound into the first junk slot; wherein the first direction is configured so that at least a portion of the solid material impactors

adapted to be discharged from the first nozzle are adapted to contact the formation and rebound into the second junk slot; wherein the breaker surface comprises one or more recesses adapted to permit broken portions of the rock ring to flow from the bottom surface of the bore to the first junk slot; and wherein each of the first and second side arms comprises a bottom face; a side wall extending from the bottom face; one or more mechanical cutters interspersed along the bottom face and adapted to break down large portions of the rock ring and abrade the bottom surface of the bore; one or more grooves formed in the bottom face; one or more other mechanical cutters interspersed along the side wall, wherein the one or more other mechanical cutters comprise one or more gauge cutters adapted to form the final diameter of the bore, and wherein at least one of the gauge cutters comprises a cutting face adapted to contact the inner wall of the bore; and one or more gauge bearing surfaces interspersed along the side wall and adapted to reduce vibration generated during the discharge of the drilling fluid and the solid material impactors.

Thus, neither of these patents provides any incentive or motivation supporting the desirability of the subject matter of claim 86. Therefore, there is simply no basis in the art to support a rejection of claim 86 under 35 U.S.C. §103(a).

Independent Claim 87

New independent claim 87 invokes 35 U.S.C. §112, sixth paragraph, reciting one or more functions and/or limitations that correspond to the subject matter in new method claim 85. Therefore, claim 87 is allowable for at least the same reasons as noted above with respect to claim 85.

Amendments to the Drawings

The attached Replacement Sheets, which include Figs. 1-16, replace the original sheets including Figs. 1-16.

The drawings stand objected to as failing to comply with 37 CFR 1.84(e) because of erasures, alterations, overwritings, interlineations, folds or copy-machine marks in Figs. 1-16.

The drawings stand objected to as failing to comply with 37 CFR 1.84(g) because margins are not acceptable in Figs. 4, 10 and 11-13.

The drawings stand objected to as failing to comply with 37 CFR 1.84(l) because the character of the lines, numbers and/or letters is unacceptable in Figs. 1-16.

The drawings stand objected to as failing to comply with 37 CFR 1.84(m) because the shading in Figs. 4-10 and 12-16 is unacceptable.

The drawings stand objected to as failing to comply with 37 CFR 1.84(p) because numbers, letters and/or reference characters are unacceptable in Figs. 1-16.

In view of the attached Replacement Sheets, which include Figs. 1-16 and replace original sheets including Figs. 1-16, the above-identified objections to the drawings are no longer applicable and it is requested that the objections be withdrawn.

Conclusion

It is believed that all matters set forth in the Office Action mailed April 21, 2006 have been addressed. Applicants have made a diligent effort to advance the prosecution of this application by canceling claims 1-76, adding claims 77-87 and submitting arguments in support of the patentability of claims 77-87.

In view of all of the above, the allowance of claims 77-87 is respectfully requested.

Unless stated otherwise, the amendments to the claims were not made for reasons substantially related to the statutory requirements for patentability.

Furthermore, unless stated otherwise, the amendments to the claims were made to simply make express what had been implicit in the claims as originally worded and therefore none of the amendments to the claims is a narrowing amendment that would create any type of prosecution history estoppel. In addition, to the extent that any formerly dependent claim is now presented in independent form, such an amendment does not constitute a narrowing amendment that surrenders any subject matter.

The Examiner is invited to call the undersigned at the below-listed telephone number if a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,

Alan N. Herda
Registration No. 50,426

Dated: 10/20/06

HAYNES AND BOONE, L.L.P.
901 Main Street, Suite 3100
Dallas, Texas 75202-3789
Telephone: (713) 547-2301
Facsimile: (214) 200-0853
File: 37163.18

Attachment: Replacement Sheets

D-1475317v2